VOL. VI JUNE, 1900 No. 6

The Forester

A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects

PUBLISHED BY

The American Forestry Association

WASHINGTON, D. C.

$1.00 a Year Single Copies 10 Cents

Entered at the Post Office in Washington, D. C., as second class matter
COPYRIGHT, 1899, BY THE AMERICAN FORESTRY ASSOCIATION

The Forester

Vol. VI No. 6

TABLE OF CONTENTS

EFFECT OF FIRES IN MINNESOTA.....Frontispiece

THE PAPER INDUSTRY AND FORESTS.....C. W. LYMAN 125
Secretary of the International Paper Co.

TREE PLANTING IN OKLAHOMA.....WM. L. HALL 130
Asst. Supt. of Tree Planting, Div. of Forestry.

TWO ARTICLES IN THE NEW YEARBOOK..... 131

DAMAGE TO TIMBER BY ACID FUMES.....HENRY S. GRAVES 135
Supt. of Working Plans, Div. of Forestry.

THE INVESTIGATION OF THE GRAZING QUESTION..... 136

OBITUARY—J. D. W. French 138

EDITORIAL:

The Summer Meeting in New York. Increase in Appropriation for the Division of Forestry. Last Month's Forest Fires. Public Indifference to the Fires. Mr. Boardman's Letter. For an Appalachian Park. Left Unfinished 139

CORRESPONDENCE:

An Interesting Holly. The Fires in Michigan..... 142

NEWS, NOTES AND COMMENT:

Investigations of Water Resources. Tree Planting in the Plains Region. Wrecking Dams and Stealing Timber. The Mohave River Watershed. Drouth, Fire and a Shortage in Lumber. A Southern Hardwood Purchase. Preserve Natural Reservoirs. Forestry in Arkansas. The Fire Came too Fast. Assistant Professor of Forestry at Yale. An Ancient Cedar. Gathering up Black Walnut. On the Raquette River. The Largest Tree. To Lumber in the Philippines. Comment on the Appalachian Park..... 144

RECENT PUBLICATIONS..... 149

HANDY LITTLE AXES

For Hunters, Surveyors and Outers

Weight 8 to 12 Ounces.

THE KEPHART KNIFE. If you Like a Keen, Durable Edge, Write for Circular.

COLDESSER BROS., Eldorado, Pa.

Forestry and Village Improvement.

Miss Mira Lloyd Dock is prepared to give informal talks on Forestry and Village Improvement, with or without lantern slides. For subjects, terms, etc., address: 1427 N. Front Street, Harrisburg, Pa.

From the Yearbook of the
U. S. Dept. of Agriculture for 1899.

By Courtesy of the
Division of Forestry.

THE EFFECTS OF FIRE AFTER LUMBERING IN NORTHERN MINNESOTA.

From the Yearbook of the
U. S. Dept. of Agriculture for 1899.

By Courtesy of the
Division of Forestry.

FOREST LAND IN MINNESOTA DEVASTATED BY FIRE.

THE FORESTER.

VOL. VI. JUNE, 1900. No. 6.

THE PAPER INDUSTRY AND FORESTS.

The paper industry is based upon the vegetable kingdom, the materials used in paper-making being almost exclusively of vegetable origin. That portion of the vegetable growth which is essential for paper-making is the cellulose ($C_6H_{10}O_5$) which forms an important part of the structure of all plants.

All vegetable matter which is treated chemically to prepare it for paper-making, is reduced to the form of almost pure cellulose. When prepared mechanically a large part of the lignin and other intercellular matter also remains. It is the cellulose of which the fiber consists. The proportion of cellulose fiber in different vegetable growths varies greatly, and with it their availability for paper-making. It may be said that almost the whole vegetable kingdom is available for paper-making, and that the use of one species or another is a matter of selection, based on the cost of the various processes of treatment and other commercial factors.

Those fibers which are commonly used in paper-making, may be divided into four classes:*

1. Seedhairs—such as cotton, which is the only representative of the class.
2. Bast fibers—as linen, jute, manila and arsonia.
3. Those derived from whole stems, or leaves, and associated with various vessels or cells not properly fibrous—as straw, esparto, sorghum and bamboo.
4. Those derived from wood.

For the purposes of this article, it is unnecessary to treat of the first three classes, except to say that a very considerable part of the paper manufactured, is made from the fibers which they comprise.

The principal woods which are used for making paper are Spruce and Poplar; but a large number of other woods are used more or less, according as the factors of price, length of fiber, ease of reduction, and relation of the mill to the source of supply vary in particular cases.

*This classification is taken from A. D. Little's "Chemistry of Paper Making," from which much of the information of a chemical nature has also been derived.

TREES USED FOR PULP.

Professor Sargent, in his report on Forest Trees, in the Tenth United States Census, gives a list of the most available species with the localities in which they occur, the substance of which I reproduce in this article, using the scientific names given by him. This list is by no means exhaustive, but simply typical of the different sorts of wood that may be utilized. For instance, there are thirty-five species of *Pinus* in the original report.

BLACK SPRUCE (*Picea nigra*). Newfoundland, northern Labrador to Ungava Bay, Nastapokee Sound, Cape Churchill, Hudson Bay, and northwest to the mouth of the Mackenzie River and the eastern slope of the Rocky Mountains; south through the Northern States to Pennsylvania, central Michigan, Wisconsin and Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina.

Easily reduced to a strong, long-fibered pulp by the sulphite process; with somewhat more difficulty by the soda process. Pulp made by the latter process is bleached with difficulty.

GRAY PINE (*Pinus Banksiana*). Bay of Chaleur, New Brunswick to the southern slopes of Hudson Bay, northwest to the Great Bear Lake, the valley of the Mackenzie River, and the eastern slope of the Rocky Mountains between the fifty-second and sixty-fifth degrees of north latitude; south to northern Maine, Ferrisburg, Vermont (R. E. Robinson) and the southern shore of Lake Michigan, and central Minnesota.

Reduced to pulp with somewhat more difficulty than Spruce; the fibers are long as in Spruce.

WHITE PINE, Weymouth Pine (*Pinus Strobus*). Newfoundland, northern shores of the Gulf of St. Lawrence to Lake Nipigon and the valley of the Winnipeg River, south through the Northern States to Pennsylvania, the southern shores of Lake Michigan, "Starving Rock" near La Salle, Illinois, near Davenport, Iowa (Parry) and along the Allegheny Mountains to northern Georgia.

Requires more severe treatment than Spruce, but yields a very long, strong fiber.

WHITE FIR (*Abies grandis*). Vancouver Island, south to Mendicino County, California, near the coast, interior valleys of western Washington and Oregon, south to the Umpqua River, Cascade Mountains below 4,000 feet elevation, through the Blue Mountains of Oregon (Curick) to the eastern slope of the Cœur d'Alene Mountains (Cooper), the Bitter Root Mountains, Idaho (Watson) and the western slope of the Rocky Mountains of northern Montana (Flathead region, Canby and Sargent).

Requires somewhat more severe treatment than Spruce, but yields a very long, strong fiber.

BALSAM (*Abies Fraseri*). High mountains of North Carolina and Tennessee.

Occasionally reduced by the sulphite process; unbleached fiber carries considerable pitchy material, which is likely to cause trouble in the mill, and which interferes with bleaching. General character of fiber similar to that of Spruce.

HEMLOCK (*Tsuga Canadensis*). Nova Scotia, southern New Brunswick, valley of the St. Lawrence River to the shores of Lake Temiscaming, and southwest to the western borders of northern Wisconsin; south through the Northern States to New Castle County, Delaware, southeastern Michigan, central Wisconsin, and along the Alleghany Mountains to Clear Creek Falls, Winston Co., Alabama (Mohr).

General character of pulp similar to that of Spruce, but wood is reduced with more difficulty, and is likely to cause chips if mixed with Spruce.

LARCH, Tamarack, Hackmatack (*Larix Americana*). Northern Newfoundland and Labrador to the eastern shores of Hudson Bay; Cape Churchill, and northwest to the northern shores of the Great Bear Lake and the valley of the Mackenzie River within the Arctic Circle; south through the Northern States to northern Pennsylvania, northern Indiana and Illinois, and central Minnesota.

Reduced by sulphite process with some difficulty, fiber somewhat sticky from pitchy material, and requires a large amount of bleach. The wood, if mixed with Spruce, is likely to cause chips. Length of fiber comparable to that of Spruce.

POPLAR (*Populus grandidentata*). Nova Scotia, New Brunswick and west through Ontario to northern Minnesota; south through the Northern States and along the Alleghany Mountains to North Carolina, extending west to middle Kentucky and Tennessee.

The wood most commonly used by mills working the soda process; never used by sulphite mills, though easily reduced by that process. Pulp from both processes very easily bleached. Fiber short and soft, associated in the pulp with much wider pitted cells.

ASPEN (*Populus tremuloides*). Northern Newfoundland and Labrador to the southern shores of Hudson Bay, northwest to the Great Bear Lake, the mouth of the Mackenzie River, and the valley of the Yukon River, Alaska; south in the Atlantic region to the mountains of Pennsylvania, the valley of the lower Wabash River, and northern Kentucky; in the Pacific region south to the valley of the Sacramento River, California, and along the

Rocky Mountains and interior ranges to southern New Mexico, Arizona and central Nevada.

Much resembles Poplar in the character of its pulp and the ease with which its wood yields to treatment.

COTTONWOOD (*Poplus monilifera*). Shores of Lake Champlain, Vermont, south through western New England to Chattahoochee region of western Florida, west along the northern shores of Lake Ontario to the eastern base of the ranges of the Rocky Mountains of Montana, Colorado and New Mexico.

Much resembles Poplar in the character of its pulp and the ease with which the wood yields to treatment.

SWEET GUM (*Liquidambar styraciflua*). Fairfield County, Connecticut, to the valleys of the lower Ohio, White and Wabash Rivers, south to Cape Canaveral and Tampa Bay, Florida, southwest through southern Missouri, Arkansas and the Indian Territory to the valley of the Trinity River, Texas; in central and southern Mexico.

Yields easily to chemical processes a short fiber, much resembling that of Poplar.

CYPRESS (*Taxodium distichum*). Sussex County, Delaware, south near the coast to Mosquito Inlet and Cape Romano, Florida, west through the Gulf States near the coast to the valley of the Mueces River, Texas, and through Arkansas to western Tennessee, western and northern Kentucky, southeastern Missouri, and southern Illinois and Indiana.

Easily reduced to pulp by sulphite process. Unbleached fiber is rather dark in color, and woolly; bleaches readily, and then much resembles that of Spruce.

BEECH (*Fagus ferruginea*). Nova Scotia and the valley of the Restagouche River to the northern shores of Lake Huron and northern Wisconsin, south to the Chattahoochee region of western Florida and the valley of the Trinity River, Texas, west to eastern Illinois, southeastern Missouri, and Madison County, Arkansas (Letterman).

Rather more difficult to reduce than Poplar; fibers somewhat shorter; pulp soft, and easily bleached.

SILVER MAPLE (*Acer dasycarpum*). Valley of Saint John River, New Brunswick, to Ontario, south of latitude 45 degrees, south to western Florida; west to eastern Dakota, eastern Nebraska, the valley of the Blue River, Kansas, and the Indian Territory.

More difficult to reduce than Poplar; fibers somewhat shorter; pulp soft and easily bleached; rarely used, and only by soda mills.

BASSWOOD (*Tilia Americana*). Northern New Brunswick, westward in British America to about 102d meridian; southward to Virginia, and along the Alleghany Mountains to Georgia and southern Alabama; extending west in the United States to eastern Dakota, eastern Nebraska, eastern Kansas, the Indian Territory, and southwest to the valley of the San Antonio River, Texas.

Very easily reduced, and yields by soda process pulp similar to that of Poplar.

WHITE BIRCH (*Betula alba*). New Brunswick and the valley of the lower Saint Lawrence River to the southern shores of Lake Ontario; south, generally near the coast, to New Castle County, Delaware.

Easily reduced. The pulp much resembles that of Poplar.

PAPER BIRCH (*Betula papyrifera*). Northern Newfoundland and Labrador to the southern shores of Hudson Bay, and northwest to the Great Bear Lake, and the valley of the Yukon River, Alaska, south in the Atlantic region to Wading River, Long Island, the mountains of northern Pennsylvania, Clear Lake, Montcalm County, Michigan, northeastern Illinois, and Saint Cloud, Minnesota; in the Pacific region south to the Black Hills of Dakota (R. Douglas), the Mullen Trail of the Bitter Root Mountains and Flathead Lake, Montana, the neighborhood of Fort Colville, Washington (Watson), and the valley of the lower Fraser River, British Columbia (Engleman and Sargent).

Somewhat more difficult to reduce than Poplar. Pulp easily bleached and similar to that of Poplar.

BUCKEYE (*Aesculus glabra*). Western

slopes of the Alleghany Mountains, Pennsylvania, to northern Alabama, westward through southern Michigan (rare) to southern Iowa, eastern Kansas to about longitude 97 degrees west, and the Indian Territory.

Said to be occasionally used in pulp making.

BLACK WILLOW (*Salix nigra*). Southern New Brunswick and the northern shores of Lakes Huron and Superior, southward through the Atlantic region to Bay Biscayne and the Caloosa River, Florida, and the valley of the Guadalupe River, Texas; Pacific region, valleys of the Sacramento River, California, and the Colorado River, Arizona.

Said to be occasionally used in pulp-making.

LOCUST (*Robinia pseudacacia*). Alleghany Mountains, Pennsylvania (Locust Ridge, Monroe County, Porter) to northern Georgia; widely and generally naturalized throughout the United States east of the Rocky Mountains, and possibly indigenous in northeastern (Crowley's Ridge) and western Arkansas and the prairies of eastern Indian Territory.

Said to be occasionally used in pulp-making.

CHESTNUT (*Castalia vulgaris*). Southern Maine to the valley of the Winooski River, Vermont, southern Ontario and southern Michigan, south through the northern states to Delaware and southern Indiana, and along the Alleghany Mountains to northern Alabama, extending west to middle Kentucky and Tennessee.

Said to be occasionally used in pulp-making.

PROCESSES OF REDUCTION TO PULP.

The principal processes by which wood is reduced to pulp, are the mechanical, the soda, and the sulphite.

The mechanical process consists essentially in grinding the wood after the bark has been removed. Thus all the sound wood in the tree is used, provided it is comparatively free from knots and not too small to be handled economically. The bark, branches and tops of the trees are therefore not available. In this process the whole structure of the wood is reduced to pulp and employed in making paper. Roughly speaking, a cord of Spruce wood will produce nearly a ton of pulp.

The soda process is based on the solvent and saponifying action of alkali at high temperature. Poplar is used more than any other wood in the soda process, but considerable quantities of Pine, Spruce and Hemlock are consumed in making long fiber stock, while such woods as Maple, Cottonwood, White Birch and Basswood are not infrequently made to replace Poplar. The portions of the tree useful in this process are practically the same as in the mechanical. Portions of the tree of somewhat smaller diameter, however, are available, and knots are not as objectionable. The yield of fiber is about 50%, thus approximately two cords of wood are required to produce one ton of pulp.

The sulphite process consists in treating the vegetable substance which contains fibers, with a solution of sulphurous acid in water, heated in a closed vessel under pressure sufficient to retain the acid gas, until the intercellular matter is dissolved. The woods which may be used are Spruce, Hemlock, Balsam and other similar varieties. Any coniferous wood which is not too resinous may be used. The same portions of the tree which are used in the mechanical process are used in this. The percentage of yield is somewhat more than 50 per cent., but roughly speaking, two cords of wood are required for one ton of pulp.

THE PULP INDUSTRY.

Ground wood, or mechanical pulp, was first made in this country in 1867, at Stockbridge, Mass. There were in 1899, 197 mills in operation in 24 States, having an estimated capacity of 3,810 tons, distributed as follows: (See table on following page.)

It is probable that the capacity of the mills is overestimated at least 10 per cent. and an allowance must also be made for the curtailment of production during the low water season. This reduction is esti-

mated at 20 per cent. Making these corrections, the average daily production would be approximately 2,800 tons, which may be estimated as equivalent to 2,800 cords.

STATE.	MILLS.	TONS.
Alabama	1	2
California	1	10
Colorado	1	16
Georgia	2	5
Illinois	1	10
Indiana	7	78
Maine	16	762
Maryland	1	12
Massachusetts	4	51
Michigan	7	165
Minnesota	2	35
New Hampshire	13	225
New York	81	1,357
North Carolina	1	2
Ohio	3	43
Oregon	4	88
Pennsylvania	4	43
South Carolina	1	5
Tennessee	1	2
Vermont	15	359
Virginia	1	6
Washington	1	10
West Virginia	3	45
Wisconsin	26	479

The soda process was first introduced into this country in 1860, the first mill being near Philadelphia. The number of mills in 1899 had increased to 21 in operation in 9 states, having an estimated daily capacity of 524 tons, distributed as follows:

STATE.	MILLS.	TONS.
Delaware	1	35
Indiana	2	65
Maine	4	120
Massachusetts	1	6
New York	2	66
Ohio	1	10
Pennsylvania	7	172
Virginia	2	35
Washington	1	15

Estimating two cords of wood to a ton of pulp, this would indicate a daily consumption of about 1,048 cords. This estimate is probably nearly correct. This wood is largely Poplar.

The sulphite process was invented in America in 1867, but the pulp was first made by it in the United States at Providence, R. I., in 1884. The number of mills in 1899 was 68, in operation in 16 states, having an estimated daily capacity of 1849 tons, distributed as follows:

STATE.	MILLS.	TONS.
Colorado	1	8
Florida	1	4
Iowa	1	5
Maine	10	337
Maryland	3	80
Massachusetts	3	47
Michigan	4	110
New Hampshire	4	290
New York	17	463
Oregon	2	26
Ohio	2	53
Pennsylvania	6	165
South Carolina	1	6
Vermont	1	30
West Virginia	1	25
Wisconsin	11	200

From data at hand giving the actual production of sulphite during the first half of '98, this estimate of capacity appears to be much too high, and should probably be cut down to 1,400 tons.

Estimating two cords to a ton of pulp, this would indicate a daily consumption of about 2,800 cords.

Assembling these estimates, we are enabled to form some idea of the amount of wood required for pulp-making, and assuming that the soda process requires Poplar wood mainly, we have an annual consumption of other kinds of wood used in the mechanical and sulphite processes amounting to about 1,680,000 cords (counting 300 working days to the year), or, allowing two cords to the thousand feet, approximately 800,000,000 feet, in addition to 310,000 cords, or 155,400,000 feet, mostly Poplar.

From this figure, representing the consumption of wood, to determine the annual cut in the United States, there must be deducted that which is brought from Canada, the quantity of which we do not know. A very rough estimate indicates that it is from 10 to 15 per cent. of the total quantity consumed in pulp making. This would bring the cut in the United States down to from 860,000,000 to 810,000,000. While this may seem to the uninformed a large quantity, yet compared with the quantity used for other purposes, it be-

comes almost insignificant. Mr. Henry Gannett, Geographer of the United States Geological Survey, in his 19th Annual Report, Part 5, estimates the amount of lumber sawed in this country annually at 23,500,000,000 feet, board measure. In comparison with this the amount cut for pulp making is but 3.6 per cent. But a great deal of wood is cut for other manufacturing purposes, so that the total is estimated at 45,000,000,000 feet, which would bring the percentage for wood pulp down to 1.9. If 180,000,000,000 feet used for fuel is added to this, we have a total consumption of 225,000,000,000 board feet, of which the amount used for pulp wood is but .4 of one per cent.

C. W. Lyman.

TREE PLANTING IN OKLAHOMA.

Present Methods and Suggestions for Improvements.

In Oklahoma the work of tree planting is being prosecuted as a rule with good judgment both as to the selection of varieties, and as to the methods of planting, but in the selection of locations for the plantations and in the methods of encouraging the growth of the best trees in belts of natural timber many mistakes are being made. It is the object of this paper to point out these mistakes, and to indicate certain methods of improvement.

The soils of Oklahoma vary greatly in their adaptability to tree growth, and at present planting is being carried on both on the desirable soils and on those which are undesirable. The uplands which predominate in area, though very fertile and well adapted to agricultural crops, are underlayed by a tenacious, resistent, clay subsoil, and are not usually good for growing trees. But in the case of valleys and ravines of small streams, which vary in width from a few rods to a mile or even more, and which cut into the upland in almost every locality, and in all parts of Oklahoma, the case is different.

The streams are almost always fringed with belts of natural timber of a dozen or more species, while along the ravines are found scattering trees of such hardy species as the White Elm, Green Ash, Hackberry and the Cottonwood. These trees usually occupy spots of ground which are fertile but inaccessible to the plow by reason of moisture or roughness. Their natural growth proves the adaptability of the valleys and ravines to arboriculture, and suggests the idea of planting extensively in such places. Experience has corroborated this, the soil and moisture conditions are almost always more favorable than on the upland, and everywhere in the West trees have grown faster and attained larger size on the lowland.

Although Oklahoma has been settled but a few years it is already in the midst of active tree-planting operations, which extend to forest as well as to fruit-trees. Though the plantations are small for the most part, something is being done on almost every farm, and the aggregate is very large. In addition to this much young timber has appeared along the streams and ravines, especially where stock has been excluded, and has made rapid growth. But the better kinds of trees have to struggle with worthless shrubs and vines that obtain a hold in such places, and growth is slower than it would be were the conditions improved.

By proper management according to the following rules, many thousand acres of such land, at present almost worthless, might be made to produce valuable timber at little expense.

1. Stock should be excluded and the land protected from fire. The young timber which has already appeared or will appear should be assisted by cutting out the worthless shrubs and vines so far as they retard the trees, and by thinning the seedlings where they come up too thickly.

2. Where nature does not fill up the spaces between the trees already growing

they should be filled by planting. It will not be possible to prepare the ground by plowing, so the planting must be done without preparation. In many cases it will be most convenient to sew seeds broadcast and rake them in, or plant them in hills. In other cases it will be best to plant the young trees. It will sometimes be possible to take up small seedlings from places where they are not needed and set them where they are needed.

3. All the plantations that are to be established should so far as possible be located on the lowland and continuous with the natural timber already present. Along all the creeks there are small valleys and jutting points that should be planted. Cultivation should be given until the tops of the young trees shade the ground so densely that weeds and grass cannot grow. The thicker the trees are planted the sooner cultivation may cease. In this planting White Elm, Green Ash, Mulberry, Catalpa, Black Locust, Russian Mulberry, Hackberry, Black Walnut and Black Cherry may usually be relied upon to be successful.

4. Orchards should be planted upon the lower slopes and in the valleys in the protection of the planting above mentioned, rather than upon the higher ground where it is frequently impossible to grow a windbreak of sufficient height to give the orchard the protection it needs.

The planting here suggested will not always place the trees where they are most desired but it will place them where they will succeed and where they will give the maximum return for the labor and money expended upon them. Upland planting is not to be wholly discouraged, but should be carried on in a limited way with a few of the most reliable species such as Black Locust, Russian Mulberry, White Elm and Soapberry.

WM. L. HALL.

TWO ARTICLES IN THE NEW YEARBOOK.

The Yearbook of the U. S. Department of Agriculture for 1899, which has just appeared, contains two articles on forestry. One, a history of the "Progress of Forestry in the United States," is by Mr. Gifford Pinchot, the Forester of the Department. The other is by Mr. Henry S. Graves, the Superintendent of Working Plans of the Division of Forestry, and is entitled "The Practice of Forestry by Private Owners."

The purpose of Mr. Graves in this latter article is to describe the extent to which the practice of forestry has come into use among private individuals in this country. He has gone over a great deal of ground that has hitherto been practically unexplored, and the value of what he says will be appreciated by all who have noted the frequency with which it is still declared, or assumed, that in America conservative management of woodlands is possible only in cases where considerations of profit are not the most important. The author points out that although it has been easy to see that many large reserves and many laws for the protection of timber have resulted from the agitation which has been going on in newspapers, magazines and scientific associations during the last twenty-five years, "the work of the many small owners and the few large owners who have managed their lands conservatively has been overlooked." Much that these private owners have done has lacked system and been "imperfect in methods and results," but it "shows the intention of true forestry and marks a great advance in the treatment of our forests." That it should not be overlooked any longer is of the first importance; and Mr. Graves' article will be most encouraging to the hope that a general and practical interest in forestry may soon be established among small as well as among large land owners.

Mr. Graves' knowledge of the forest work carried on by private owners is based on the answers to a circular letter of inquiry regarding the prevailing methods of handling woodlands that was sent out by the Division. Answers were received from about 2,000 persons, from forty-six states and territories, "nearly 1,000 of whom stated that they had done some work which might be classed as forestry." As but little of this was guided by a scientific knowledge of methods and results, or called "forestry," Mr. Graves early takes pains to justify his use of the word, and to make clear his idea of its meaning, by saying that "wherever land is managed with the intention that it shall yield repeated crops of timber, and is so treated that the producing power is maintained at a high point, there true forestry is practised." He then goes on to give a general account of the attempts at forestry described in the answers to the letter of inquiry, with occasional references to instructive examples.

The material falls into five groups; that comprising cases (1) of careful thinning; (2) of careful cutting of sprout-land; (3) of conservative lumbering; (4) of protection against forest fires; (5) of forest planting. In the matter of careful thinning it is of the first importance where woodlands already exist that the owners of small holdings should be able to take good care of them. It appears that many small farmers have studied this problem and manage their woodlots with great intelligence. As might be expected a large number of instances are from the older Eastern States, and especially the more northerly ones. A Massachusetts farmer for example is quoted as writing: "Ten years ago I began to cut all trees except White Pine. I trim the trees as high as a man can reach easily, namely, 6 to 8 feet, leaving all limbs on the ground. I leave the outside trees, which are exposed to the sun, as a protection to the trimmed trees. I thinned and pruned the trees when about twenty years old, leaving about 200 per acre." But yet "this careful work is by no means confined to the Northeast."

From the Yearbook of the U. S. Dept. of Agriculture for 1899. By Courtesy of the Division of Forestry.

WHITE PINE GROVE IN WHICH THINNING AND PRUNING HAVE TAKEN PLACE, PLYMOUTH, MASS.

"Letters were received from nearly every state to the effect that a very large number of farmers endeavor to use conservative methods in cutting their wood lots." Among others a farmer in California is quoted: "In the winter season, when time will admit from farm work, I cut out all the poorest growth, leaving only thrifty trees, about 200 to the acre. I draw all brush to some clear ground and burn it. I burn all chips and trash and obtain a large amount of ashes, which I throw around my apple trees."

The article next states that on sprouting from hardwood stumps small owners have based a great deal of work with reference to a later forest crop. "It is common to hear this practice vigorously condemned, but as a matter of fact it is one of the established systems of forestry used in Europe as well as in this country. For the production of fire wood it has many advantages; and, if the cutting is done carefully, the growth will frequently amount to one cord per acre per annum. Thus, New England farmers calculate that about twenty-five years are required for cleared sprout land to produce twenty-five cords of wood per acre. This system has been in practice since the early settlement of the country, and in many cases old Oak stumps may be seen from which repeated crops of sprouts have been cut and which have become, under the treatment, gnarled, misshapen, and covered with irregular knobs." * * * "A number of correspondents stated that they are accustomed to cut the stumps close to the ground, so that independent roots will be formed and the wind will not break off the sprouts, as would often be the case with high stumps."

Mr. Graves next takes up the owners of large tracts of timber land, and begins by saying that "The most extensive work in forestry by lumbermen has been done in the Spruce forests of New York and the New England States." "A large number of owners," following the example of E. S. Coe, of Bangor, Maine, have "limited the cutting of Spruce to a certain size, but, so far as the writer is informed, the cuttings have not been regulated in a systematic way, except on the tracts belonging to Dr. W. S. Webb and Hon. W. C. Whitney, in the Adirondacks, where the land has been lumbered under a system devised by the Division of Forestry." Several specific examples of conservative lumbering are cited and described. One interesting method is that used near Lake Winnepesaukee, "where the lumbermen, in a number of cases, have left White Pine trees for seeding purposes. The trees are usually spreading, scrubby specimens which are of no great value, but which, nevertheless, would bring a small price for box boards. The lumbermen calculate that about two to five good seed trees of Pine per acre, evenly distributed, usually secure an excellent natural reproduction. It is the custom, therefore, to leave standing not less than two or three spreading trees per acre." In Maine some of the lumbermen who cut second growth White Pine, "leave standing all trees under twelve inches in diameter, and calculate that they can return for a second crop in about twenty years." After describing certain methods which have been used in the South, and which, in some instances, have been adapted with much elaboration to a combination of forestry and stock raising, Mr. Graves concludes of the attempts at forestry on the part of lumberman: "The instances of conservative lumbering described in the preceding pages are but examples of work which has been carried on by a large number of lumbermen. The systems have been devised by the owners themselves, and, while in many cases improvements could be made, the work shows that much more has been done in the way of forestry than is generally supposed."

In many parts of the country the problem of protection from fire is the first one which the forester has to solve. In the farming countries the small and well-separated holdings can usually be protected by some care in watching, and by taking certain further precautions which are "now coming into use, such as clearing wood roads, burning fire lines, piling and burning tops, after cutting, etc.," but on large tracts the case is different. It is often im-

practical to construct fire lines, and on these tracts the most disastrous fires occur. Mr. Graves points out, however, that many lumbermen have devised methods of protection, based usually on systems of ranging and patroling the woods, which have proved successful in every way. Some of these are described with more or less detail. Among them is that used by Dr. W. S. Webb on his tract of 4,000 acres in the Adirondacks.

Several interesting pages are devoted to forest plantations. Of these many have been made not only in the treeless regions of the West but in the East also, and notably in Massachusetts.

The fact that stands out above all others in this article is that the land owners who devised and put into practice the simple but effective methods of forest management which it classifies and describes, were guided in almost every case solely by their business instincts. Most of them probably had no knowledge of what European foresters have accomplished, but they also had no unattainable ideals before their minds. Their rough-and-ready methods have doubtless been defective in more ways than one; but most of them have been based on sound common sense. In so far as considerations for the future shaped their work it has been true forestry. It shows that in this country, although technical knowledge has been entirely lacking, forestry, even in small private woodlots, is not inconsistent with management solely for profit.

The nature of the article by Mr. Pinchot on the "Progress of Forestry in the United States," can easily be gathered from its title and from two sentences which are quoted in the preface of the Year Book from the annual report of the Secretary of Agriculture for 1898. "For 1899 I am considering the propriety of making a special effort to prepare a publication which shall contain a résumé of the achievements of the United States in every branch of science as related to agriculture during the nineteenth century, for distribution at the Paris Exposition."

"Every bureau and division in the Department charged with scientific work should therefore contribute one or two articles reviewing the progress made in the application to agriculture of the particular science in which it is concerned."

The article occupies twelve printed pages and is illustrated by a map and by photographs. It first gives a brief but clear and very interesting account of the way in which the forest resources of the country have been regarded and treated since the earliest times. This is done chiefly by sketching the changes which have taken place in the treatment of the forest, from the time when the first settlers hindered rather than helped themselves by an economy, which was the result of their early associations with the game and forest laws of Europe, through the period when every man could own woods and cut them freely, to the era of railroads and great lumber markets in which lumbering on a vast scale came into existence. When the cutting of great stretches of primæval forests for railroads and for distant cities, states and countries began, the need of taking preservative measures again became apparent. Little by little a distinct interest in forestry and a forest policy developed. At first the signs were all too faint, partly perhaps because "contrary to the general rule in other countries, practical forestry here began first on private lands and wholly without relation to government action." But legislative measures for protection against fire in many of the states, the creation of public preserves and parks; the action of the National Academy of Sciences, the American Forestry Association, and other associations; and the work of committees and commissions, brought forest questions to the attention of the public generally, and attracted to them an ever increasingly wide and active interest.

Mr. Pinchot devotes the last half of his paper to a thorough survey of the present situation, not only in the separate states, where more or less control of the forests is beginning to be exercised, but also as regards the work of the Federal Government, and the general condition of public opinion expressed through various associations, schools of forestry, etc. Of the position

which the Division of Forestry of the Agricultural Department now occupies, Mr. Pinchot says, "Through a system of coöperation with experts in forest matters throughout the United States, the Division of Forestry is becoming in fact what it has long been in intention, the center of all forest activity in the United States, while through the appointment of student assistants it is gathering about its work a corps of young men, who, beginning their forest studies while actively engaged in the work of the Division, principally in the field, will complete them at one or another of the forest schools. In this way, as well as through the schools alone, the need for men, which is among the most pressing requirements of forestry in the United States at present, will gradually be met." The weakness which necessarily results in the present division of work between the Geological Survey, the Land Office and the Division of Forestry, is pointed out.

It would be well if some of the things which Mr. Pinchot says about the present situation in this country in the last part of this paper could be read and heeded widely. The statement of the complete separation "between the administration of the reserves in the General Land Office, and the force of trained foresters, specially equipped for that purpose in the Division of Forestry" is one of them. Another concerns the relation between forest legislation and the protection of fish and game, and can be quoted in part. "Hitherto it has been much easier to secure legislation for the protection of fish and game, than for the protection of forests. In the future however, as the various states produce or perfect their machinery for the right handling of forest lands, a much closer connection may be expected, in which it is most probable that all interested will find their profit. The protection of fish and game is a natural function of the forest guard."

DAMAGE TO TIMBER BY ACID FUMES.

It is common to find certain species of trees in large cities sickening and dying from the effects of poisonous gases. The damage to forest trees from smoke is very common near mines and chemical works, especially where the smoke contains a large amount of sulphur fumes.

A striking instance of the injury to timber by acid fumes has recently come under my observation at Ducktown, Tennessee, where there are extensive copper mines. Here the crude ore is roasted in open sheds in order to drive off a certain proportion of the sulphur. In the immediate neighborhood of the mines the timber has long since been cleared to supply the roasting-sheds. In consequence, the winds have a clear sweep, and the smoke containing a large amount of sulphurous acid is carried for a great distance. Immediately about the roasting-sheds no vegetation whatever can live. At a distance of about one-third of a mile grass is able to survive; and about one-half mile away, certain species of trees maintain a sickly existence.

The tree most susceptible to injury appeared to be the White Pine. I found trees of this species at a distance of seven miles in an air line from the roasting sheds which were without doubt killed by the sulphur fumes. It is probable that Hemlock is fully as sensitive, but as it occurs in protected ravines the damage is much less extended. River Birch appears to be easily killed by the smoke, and as in the case of other trees, begins first to die down from the top. It is common to see trees with the tops dead and broken, and with a fringe of living branches at the base of the crown.

In passing rapidly through the country only a general study of the effect of the smoke on different species could be made. Enough was seen, however, to make possible the following provisional list, which shows the relative degree of sensitiveness

of the various species. The list begins with the most sensitive. White Pine, Hemlock, River Birch, Mulberry, White Oak, Chestnut Oak, Chestnut, Black Oak, Red Oak, Ash, Willow, Beech, Poplar, Blue Beech, Bellwood, Locust, Honey Locust, Red Maple, Virginia Scrub Pine, Black Gum, Sourwood, Dogwood.

The last three trees in the list are very hardy and were found within one-half mile of the roasting sheds. It was somewhat surprising to find the Scrub Pine so resistent, but it appeared to stand the sulphur better than any other trees except Black Gum, Sourwood and Dogwood.

HENRY S. GRAVES.

THE INVESTIGATION OF THE GRAZING QUESTION.

The investigation of the question of grazing in the forest reserves has been begun by Mr. Gifford Pinchot, the Forester, and Mr. Coville, the Botanist, of the Department of Agriculture, who left Washington, D. C., in the middle of May and are now studying the conditions in Arizona.

The grazing question is the most important one which has thus far come up in connection with the reserves, and in it have been involved most of the strong objections to them. Until the advisability of permitting grazing is no longer an open question, until it has been determined after a thorough and impartial investigation of the conditions in each reserve, the angry opposition to them which exists in some regions cannot be expected to diminish. At present there is probably nothing that could do more to establish the desirability of reserves in the minds of those who still object to them than to make possible an intelligent regulation of grazing. For this reason the letter of instructions which is being issued to its field agents by the Division of Forestry is both important and interesting. The letter tells its own story and is here given in full. It is being sent to all of the agents of the Division who are to be at work in the Big Horn, Washington, Mount Rainier, Uintah, Gila River, and Yellowstone Park Timber Land Reserves, and to those in the Sierras and southern California. The letter is as follows:

"The investigation of the effect of grazing upon the national forest reserves in which you are about to engage will be governed throughout in accordance with the following considerations:

"This investigation is undertaken at the request of the Honorable Secretary of the Interior. In the letter to the Honorable Secretary of Agriculture which contains his request, after referring to the preparation of other reports on forest matters for the Interior Department by this Division, he says:

"'Grazing in the national forest reserves being one of the most important of all the questions which relate to them, will naturally form a chief subject of the above-mentioned reports. In the necessary investigations and in preparing these reports, I have the honor to request that special attention be given to the following phases of the subject:

"'1. The grazing industry in the forest reserves in relation to taxation and the general propriety of specified localities.

"'2. The relation of grazing to forest fires.

"'3. The relation of grazing to the preservation and reproduction of forests.

"'4. The relation of grazing to irrigation and water supply.

"'5. The relative effect of grazing by various kinds of stock.

"'6. Moderate grazing and over-grazing in forest reserves.'

"In undertaking the investigation along these lines this Division occupies a completely impartial position. It has no case to prove, no interest to favor except the public interest, nor any preconceived ideas to establish or defend. Its only concern

is to discover and report the essential facts, and upon them to base its recommendations. In order to destroy any chance of mistake or misunderstanding upon this subject I quote from an official statement by the Honorable Secretary of Agriculture. Certain misconceptions of his attitude, by which he has been represented as uncompromisingly hostile to forest grazing having been widely circulated, it is important that you should know where he stands. He says:

"'Every question of grazing should be decided in each reserve and each part of a reserve on its own merits. As a rule, grazing should be regulated, not prohibited, except in special cases like southern California. Many parts of forest reserves contain excellent grass and other forage which can be harvested only by grazing and which should not be wasted.'

"This investigation will be carried out strictly in the spirit of the Secretary's statement.

"Just now public interest in forest grazing is exceedingly keen. Great industries will be affected by a decision to permit or prohibit it in the forest reserves or in any part of them. The possibilities for public and private gain or loss are large. Radical differences of honest opinion are frequent, and testimony both that grazing injures the forest and the interests that depend upon it, and that it does not, is forcible and abundant. While you should hear both sides fully, and should avail yourselves of whatever friendly assistance you may require and either side may offer, your report must be based on your own personal observations. The statements of interested parties should be tested in all cases by comparison with the facts you have yourself ascertained at first hand on the range. It is of the first importance that you should know the range thoroughly. You will find it necessary to plot the ranges on a map as part of your report.

"It is essential that a full description of the forest should accompany each discussion of the effect of grazing upon it. An outline for such a description is supplied to you on a separate sheet.

"Your report should be illustrated and your conclusions supported throughout by numerous photographs.

"The following list of questions is intended to indicate some of the lines along which facts are needed. It is not complete. The questions apply to all kinds of grazing animals, but especially to sheep, since sheep grazing is by far the most important grazing question which relates to the forest reserves. Your attention is specially directed to the last two questions, the need of a full report upon the relative effect of grazing by different kinds of stock, and in particular upon the relative loss and gain if grazing is permitted or prohibited.

SPECIMEN QUESTIONS.

"1. What kinds of plants are grazed, in order of preference, including grasses, herbaceous plants, shrubs and trees?

"2. Are conifers eaten, and if so, under what circumstances and to what extent?

"3. How does grazing affect the native grasses?

"4. How is over-grazing related to forest preservation?

"5. Does continual moderate grazing affect the reproduction of the forest, and if so, how and to what extent?

"6. Do grazing animals injure young trees by trampling? If so, how and to what extent?

"7. Are old trees, if shallow-rooted kinds, such as Spruce, injured by trampling?

"8. Is damage done to soils of various kinds and situations by trampling, and if so, how and to what extent?

"9. Does grazing affect the run-off of streams? If so give proof in full.

"10. Does grazing affect the superficial run-off of rain-water?

"11. Do the streams from areas denuded by grazing carry more sediment than formerly, and if so, how is it proved?

"12. Does grazing increase or diminish the danger from fire?

"13. Do herders or stockmen set fire to the forest in order to improve the range?

"14. What is the effect of repeated burning on the forest and on the range?

"15. How long is required before burned range can be grazed again, in the forest and outside?

"16. What is the relative effect of grazing before and after burning on the grass, the forest, and the soil?

"17. What areas are most often burned?

"18. What areas in the reserve are grazed?

"19. How many head are grazed in the reserve?

"20. What proportion of this number are assessed?

"21. What proportion of the head owned and assessed in any one county are grazed in the reserve?

"22. At how much are they assessed per head?

"23. Are the owners and herders usually citizens or aliens?

"24. What lands are best adapted to grazing?

"25. How long has grazing been carried on in the reserve?

"26. Discuss handling during the year: wintering, when driven into the mountains, how herded in the mountains, when driven out, the cost of herding, etc., etc.

"27. Discuss the wool market and the market for hides and meat, with reference to the grazing industry in the reserve.

"28. How large an area in the reserve is required to graze 1,000 head during one season without over grazing, and what number of head will the reserve safely carry?

"29. Would a system of leasing grazing lands in the reserve work well, and if so, under what regulations?

"30. Is the grazing in the reserve more or less valuable to adjacent communities than the protection of the forest by the prohibition of grazing?"

J. D. W. French.

John Davis Williams French, the son of Jonathan French, a Vice-president of the American Forestry Association, died at Atlantic City on May 2, 1900. His early home was in Roxbury, where among the productive and beautiful horticultural surroundings of those days he acquired his fondness for all out-of-door occupations. Mr. French obtained his early training at the schools of Roxbury or Boston, and graduated at Harvard College in the Class of 1863. After graduation he served as a valued member of the Christian Commission, with our army at the front.

In his agricultural work, results upon his land at North Andover, Essex County, have proved him to be a skillful farmer, horticulturalist and forester. He knew the value in agriculture of the wise application of intelligence thereto, and it was his earnest endeavor to impart, and have imparted, such ideas to those who could or would be benefited by such application and knowledge.

He was an exhibitor and officer in the Massachusetts Horticultural Society and a leading member of its Library Committee, and its Committee on Lectures and Publications.

His interest in all branches of forestry, and his activity in "Village Improvements," made him useful and influential in national as well as local forestry matters. His last effort in the cause of tree-culture was shown in his earnestness to complete the organization of the new Boston Common Society, with the object of aiding in the maintenance of Boston's ancient Common in the best possible condition.

He was an earnest and active worker with mind, body and purse in the cause of Christianity within the Episcopal Church, and outside of it; and in many places will be greatly missed, and his place will be hard to fill.

Mr. French was at one time a member of the Boston Common Council from Ward 11; and at the time of his death was a trustee of the State Agricultural College; President of the Bay State Agricultural Society; Vice-president of the American Forestry Association, and Vice-President of the Essex Agricultural Society. In his will he bequeathed $2000 to the American Forestry Association.

The Forester,

PUBLISHED MONTHLY BY

The American Forestry Association,

AND

Devoted to Arboriculture and Forestry, the Care and Use of Forests and Forest Trees, and Related Subjects.

All members of the American Forestry Association receive the FORESTER free of charge.

To non-members the yearly subscription rate is one dollar. Single copies of the current issue and of most back numbers can be had for ten cents apiece.

All contributions and communications should be addressed to the EDITOR,

202 14th Street, S. W., Washington, D.C.

Vol. VI. JUNE, 1900. No. 6.

The Summer Meeting in New York. The special summer meeting of the American Forestry Association, which is to be held in New York City, June 25th and 26th, promises to be very interesting. It is expected that the President of the Association, Hon. James Wilson, Secretary of Agriculture, will be present and preside at one or more of the sessions. An interesting program has been arranged, and among those who will speak or contribute papers to the meeting are Mr. Henry Gannett and Mr. F. H. Newell, of the U. S. Geological Survey; Hon. Charles W. Garfield, President of the Michigan Forestry Commission; Prof. Wm. B. Clark, of Johns Hopkins University; Dr. B. E. Fernow, Director of the New York State College of Forestry; Col. William F. Fox, Superintendent of State Forests, New York; Mr. Ernest Bruncken, Secretary of the Wisconsin State Forestry Association; Dr. J. T. Rothrock, Commissioner of Forestry for Pennsylvania; Prof. J. W. Toumey, Mr. Henry S. Graves, Mr. Geo. B. Sudworth and Mr. Otto J. J. Luebkert, of the Division of Forestry, U. S. Department of Agriculture; Mr. James McNaughton, of New York City; Prof. Wm. R. Lazenby, of Ohio; Hon. E. V. Preston, President of the Connecticut State Forestry Association.

Among others papers on the following subjects will be presented: The work of the U. S. Geological Survey in the Forest Reserves, The Michigan Forestry Commission and Its Work, Forest Survey Work in Maryland, Some Adirondack Forest Problems, Adirondack Forest Fires of 1899, Forest Matters in Wisconsin, Forest Reserves of Pennsylvania, Progress in Tree Planting in the United States, particularly the Middle West, History of Forest Legislation and Administration in the State of New York, Notes on Some Forest Trees of Ohio, Forest Interests in Connecticut, Work of the Federation of Women's Clubs, Forest Insects, Forest Fires.

Increase of Appropriation for the Division of Forestry. On May 25th, President McKinley signed the "Act making appropriations for the Department of Agriculture" by which the Division of Forestry is allowed $80,000 for the fiscal year ending June 30, 1901. This sum is just twice as large as the annual appropriation for 1899–1900, which, in its turn, doubled the appropriation for the previous year.

The Division of Forestry could well use many times $80,000 with great profit to the country, but for the time being the appropriation may be considered a matter for rejoicing. It shows that Congress understands better than it did, that the rapidly deteriorating forest resources of the United States present problems which should be faced and looked after, and that the public is beginning to realize how far from profitable or desirable is indifference to these problems. Once the ball has got well under way too, it can be counted on to grow of itself. The Division can now hope to make its value and importance evident to a much greater extent than it has ever been able to before; and if the interest in forestry and the intelligent understanding of the country's need of it go on increasing, it may even be hoped that people will see soon that in distributing what is really a forester's work, between the General Land Office, the Geological Survey and the Department of Agriculture, much waste of time, money and en-

ergy, and a decided loss of efficiency is necessarily involved. As a leading New York paper said recently: "There is fair reason to assume that Congress will discover ere long that it has done only half its duty in increasing appropriations, and will follow this with new legislation giving the Division not only more money, but the authority which logically belongs to it." This month one is much more than ever before inclined to hope this may prove true.

Last Month's Forest Fires. During the month of May the newspapers and lumber journals have again been sadly full of notices of forest fires in Minnesota, Wisconsin and Michigan. At the beginning of the month an early and prolonged drouth in these states had dried up everything, and had so reduced the streams that many of the log drives were stranded. Lumber yards, mills and settlements were destroyed, and in many cases the unsawed logs, held up on their way to the mills by the shrinkage of the streams, were burned. A correspondent of the *American Lumberman* wrote from Marinette, Wis., under date of May 10th—"Logs in the river were actually on fire last week. Mr. Stephenson says that both banks of the Menominee river for over a hundred miles up and thirty miles inland were covered with smoke and flames." "The losses of Cedar stock, standing timber and property will aggregate many hundred thousand dollars." The tract here described is large enough to embrace the whole of the White Mountain region of New Hampshire, or of the Adirondack region in New York, and yet it is only one of many over which, during this spring alone, similar fires have been raging. The correspondent of the *American Lumberman* mentions the disaster in his particular district briefly and then passes on to other subjects. In a short editorial the paper makes this comment: "The proposed Minnesota National Park was invaded by the forest fires in that section of Minnesota and it has been feared that irreparable damage might be done to the Pine growing in it. If it were now a national forest reserve prompt measures would be taken to check the spread of the flames."

Public Indifference to the Fires. This quotation from the *American Lumberman* is, on its face, merely one more argument for the Minnesota Park. Such the editor probably intended it to be; but significant in this regard as it is, it leads the reader's thoughts into another channel also. If the land within the proposed boundaries of the park, "were now a National Forest Reserve prompt measures would be taken to check the spread of the flames," says the writer. One can but wonder again that it should be only in the National Forest Reserves that measures for protection are to be expected, that the American public at large is so completely indifferent to forest fires. It is easy to go off in explanation and to refer to the warfare which our fathers, axe in hand, had to carry on against the wilderness. But this does no good. The important thing is the thing itself—that, strange though it may seem, this country prefers to see millions of dollars worth of property go up in smoke year after year, to protecting its forests from fire as it protects its farms from floods and its cities from conflagration. Crowds flock to see a burning house; a burning forest passes unnoticed. One eastern editorial-writer may remark that: "If the fiery lesson involved in the loss of millions of dollars worth of grown and growing timber shall make no impression upon the public mind, and create no active interest in the enactment of measures intended to prevent such preventable destruction, the friends of forestry might almost despair of their cause." But in another column of the same issue his paper is likely to devote but twenty lines to recording the destruction of four new towns, the loss of two score lives, and the conversion of a green and flourishing county into a charred waste. The editorial goes unread; the public estimate of forest fires is gauged by the brevity of the inconspicuous news-item.

What is to be done then? The fre-

quency and extent of the fires is the reason why they attract so little attention, and are not more generally recognized as serious. That people are not alive to their full consequences is the sole reason why steps are not taken to prevent them within the hour. Indifference and the fires are then one. But it also follows in the same breath that if you reduce either the disappearance of the other is sure to begin. There is no way out of a circle until you break out; but do this and the circle disappears. Let the fires burn and a young forest will be valued at little more than the price of an ash heap. Spend one half cent per acre on New Jersey and every land owner in the State wakes up to the fact that he has become richer by a prospective normal forest crop. He realizes that forest fires are unnecessary and do great harm. He becomes interested, and may even find himself eager to pay a cent an acre. Practical forestry begins to be possible.

This is not an idle speculation but what all those who have considered the question of enabling the country's forest lands to yield a sustained revenue realize and agree to. As long as no effective measures to prevent burning are taken, nothing can be done. Foresters say this, reserve rangers say this, and it is justly the burden of the lumberman's excuses and complaints.

Mr. Boardman's Letter. In his communication on another page Mr. Boardman comes near to stating in a nutshell what is almost the whole forestry problem in Michigan and some of the neighboring states. Mr. Boardman says that on the lumbered and burned-over lands "the tax liens are so heavy, that the State is practically, but not technically, the owner." In other words, the State forces the owners to abandon responsibility for the land, to leave it unprotected from fire and thieves; but does not in its turn undertake to shoulder the burdens which it has made the private citizen lay down. The young growth, which, if protected from the annual fires, would come up of itself, and which land owners would be glad to encourage, is so heavily taxed that merely to retain title to it while it grows up is out of the question. The result, as things are now, is that every year fire ranges over thousands of acres, destroying the trees and the soil, and gradually but surely depriving the region of all the benefits to industry, land and climate which accompany flourishing forest vegetation. Lumbermen may have cut down the first growth, but that many towns and counties are now only ragged and blackened wastes is not all their fault. Much of the blame should be laid at the doors of the legislatures and tax-assessors who compel the abandonment of cut-over areas, and then take no proper charge of them themselves.

For an Appalachian Park. The promoters of the Appalachian National Park have drawn up a resolution in its favor addressed to Congress which they invite "every person, corporation, association, business firm or other organization interested in these important economic factors in our national and social well being," to endorse:

"The application of scientific forestry under government control to the rapidly disappearing forest lands of the southern Appalachians.

"The preservation of the forests and the perpetuation of the natural scenery of these mountains.

"The protection of the headwaters of the various important streams which find their origin in this section, and of the many minor water courses upon which the fertility of the lower levels depend and which many of our industries require for power.

"The protection of the game, songbirds and fish of the region.

"The opening up of this great and impressively beautiful region by adequate roads, thus supplying the large centers of trade with a great sanatorium and resort within a few hours' journey.

The circular also says:

"It is urged that whosoever may read this circular will take active interest in this

great project and obtain its endorsement by the most influential body or organization which he can approach."

Copies of the circular and resolution may be obtained by application to Dr. C. P. Ambler, Secretary of the Appalachian National Park Association, Asheville, N. C.

Left Unfinished. The June number of THE FORESTER goes to press as Congress is about to adjourn. It is to be feared that in the rush of business, which precedes adjournment, action on the Minnesota Park project, the purchase of the Calaveras grove, and other less important matters will be left incomplete. Regretable and disappointing as this is, the situation still has some features which enable one to feel not altogether discouraged. On the twelve Indian reservations in Minnesota no cutting is being allowed even under the dead and down timber act. Under date of May 23d the Chicago correspondent of *Forest and Stream* wrote: "Col. Cooper has done that much already. He has kept all that Pine standing where it was. This is a great deal to have accomplished, but it surely has been done, and Secretary Hitchcock stands firm in his position that no more Pine shall be cut until this matter has been looked into." Similarly in the case of the Calaveras grove immediate lumbering is hardly to be feared. The authorization to purchase it came so near to being passed that the owners could have small inducement to begin the work of felling the trees until Congress has had a chance to finish with the question one way or the other. That the purchase should not be authorized, if proposed again, is, in the light of the favor the resolutions have met with this year, almost inconceivable; and finally that it will once more be brought in is happily not to be doubted. This project like that for the Minnesota Park and the one in the southern Appalachians, has been put before the country too well, and has received popular support that is too general and enthusiastic for it to die a natural death. The ground that has been gained in the way of resolutions brought in and passed may apparently be lost, but the work that has been done has counted none the less, and if it is kept up it will gain its objects in the end.

CORRESPONDENCE.

An Interesting Holly.

TO THE EDITOR OF THE FORESTER.

Sir: During a recent trip in the Unaka Mountains of Tennessee I encountered a Holly which was of unusual interest in that nearly every leaf upon it was entire. An occasional leaf showed one, or sometimes two, spines on the sides, but fully 90 per cent. were wholly without spines except the apex. This interesting specimen stood beside a Holly with leaves normal in every respect, while a short distance from it were trees whose leaves showed every variation from the entire to the ordinary type.

HENRY S. GRAVES.

The Fires in Michigan.

TO THE EDITOR OF THE FORESTER.

Sir: During the early weeks of May, this year, I traveled over many miles of the wild lands in the northern part of the southern peninsula of Michigan, where the usual yearly fires were making slow consumption. These fires do not burn everything cleanly, or cover the same ground each year. They seem to have a devilish tendency for finding their fuel after an interval of years when the second growth has acquired, or is about to have, a value. They travel slowly, supported by the dry grass, the smaller trees that were killed by a preceding fire, the fallen Pines

and old skidways. On the hills the clear sand of the Pine lands, before cuttings were made, gave no support for fires. The wet Cedar and Tamarack swamps protected themselves. After cutting, the slashings, fire weed and grasses became the kindling.

The state which has set the pace for all others in fish culture has apparently ex-

owners practically lost title by non-payment of taxes; the logging railroad spurs were abandoned; and each year the fires consumed more and more of the less valuable Pine, Cedar, Poplar, and hardwoods. The tax liens are so heavy that the state is practically, but not technically, the owner. Now, since the railroads and settlements have reached the edges of the burnings,

SECOND GROWTH POPLAR KILLED BY FIRE.

celled all in riotous waste of its timber wealth. The pity of it is that this useless waste could be stopped at small cost. Never was there an easier place for starting a fire. A smoker needs to be only ordinarily careless with his match. But never, also, was there an easier region for fighting one. A few men with tools for handling sand can turn the flanks and rapidly narrow the front of a Michigan fire. But, owing to an extraordinary complication of ownership, no one person is vitally interested except in isolated cases of large tract ownership; for after the first great crop of White Pine was burned or marketed, the land was commonly assumed to be worthless; the

and the developments of civilization have shown new uses for wood not formerly considered valuable, it is easy to look backward and, with visions of the wealth that has gone up in smoke, sigh for what might have been.

Even now it is not too late. Although a great deal of hardwood is destroyed yearly, nevertheless there is apparently enough left to make cheap furniture, tool handles, spools and the like, for a nation. There are bunches of Norways, which, because of their location on the sand hills, are only occasionally burned; Cedar, below the size for railroad ties, which in the swamps is partially protected from fire; second-growth Poplar, which down to

5 inches diameter has value for boxwood and pulp. There is much to be saved now, and more to be had in future years if the trees could be allowed to grow.

I regret that I had a camera with me only one day, but I send you a photograph showing where the fire had just killed the second-growth Poplar.

W. H. BOARDMAN.

NEW YORK, May 18, 1900.

NEWS, NOTES AND COMMENT.

Investigations of Water Resources. By recent act of Congress the investigations of the water resources of the country being carried on by the Division of Hydrography of the United States Geological Survey, have been notably enlarged. The appropriation for this purpose for several years has been $50,000 per annum. During the last fiscal year, however, this was increased in various ways so that upwards of $90,000 were expended in surveying reservoir sites in the arid region, investigating underground waters, and measuring the flow of streams both east and west.

For the next fiscal year the amount of $100,000 will be available. Attempts were made to secure an increase to $250,000—the lead in this matter being taken by the National Irrigation Association and similar bodies throughout the country. Various Boards of Trade and commercial clubs interested in the development of the country joined in the movement, as well as engineers and investigators desirous of having official data upon which to found plans for various projects.

Although the full amount requested by the various petitions was not received, yet the increase makes it practicable to take up a number of problems throughout the United States. Reservoir surveys will be actively pushed forward in the High Sierras, in California and in the Rocky Mountain region, particularly in Montana and Colorado. In the South and East a number of important undeveloped water powers will be examined and detailed measurements made of the flow of the streams.

Requests and memorials are being received from various parts of the United States for the extension of systematic measurements of important rivers. These are being carefully considered in the light of public importance and benefits of the results. In this connection, the officials in charge desire to have all such requests for systematic measurements of rivers, investigation of underground waters, etc., sent in at an early day, in order that each locality may have proper consideration. Engineers who have in mind streams—especially those flowing across State lines, whose waters are important for industrial developments may be able, by making prompt application, to secure systematic measurements of the available volume of water.

*

Tree Planting in the Plains Region. As is well known, the tree claims of the prairies of the West while occasionally successful have nearly all proved failures. This is accounted for by the fact that hitherto the requirements of the trees planted were not known to the planters. This spring however, thirty-three planting plans are going into operation as a result of the offer of the Division of Forestry in Circular 22, and during the summer similar plans will probably be completed for over one hundred more of those who have applied for them. These plans furnish the owners of the lands for which they are made, with detailed instructions for planting and recommend the species best adapted to each tract.

Of the applications for advice in planting plans, 90 per cent. have come from the treeless regions of Texas, Oklahoma, Kansas, Nebraska and the Dakotas. The results of the first investigations in the

Division are about to appear in print, as Bulletin No. 27, of the Division, under the title, "Practical Tree Planting in Operation." This bulletin reviews the general situation in what may be called the tree planting region. The sort of work it outlines will be followed up vigorously this summer.

As a further result of its work in help to tree planters the Division of Forestry will place two or three field parties in the plains region of the West after July 1st. These will study the encroachments of trees on the plains and will also estimate by valuation surveys, the kinds, growth and size of trees in planted groves. This work will give for the first time an approximate estimate of the yield of planted trees and of the actual timber value of forest plantations in the United States.

Wrecking Dams and Stealing Timber.

"Within the past fortnight two important logging dams on the upper Mississippi River have been blown out by means of dynamite handled by lawless men. The one was on the Crow Wing, where a drive of 54,000,000 feet of logs was dependent on the water of the dam; the other on Bemidji Lake, where 30,000,000 feet of logs were ready to come out through the dam. The destruction of the Crow Wing dam was the second depredation of the sort committed there within the past two years.

Both of these cases are aggravated acts of lawlessness. Both were done by citizens near the dams and for the alleged reason that the dams flooded property owned by citizens. The first destruction of the Crow Wing dam was affected while the watchmen were away under arrest on charges trumped up by the people who destroyed the dam. The second destruction was probably by the same people, though the owners of the dam had paid liberally for all damages claimed. The wrecking of the Bemidji dam was, however, a step beyond the Crow Wing crime. Presumably for purposes of spite, but on pretended grounds of damage from high water, the Sheriff of Beltrami County, with a posse of deputies, ordered the watchmen off the dam, and, in spite of their promises to raise the gates and give the desired relief, blew up the dam after the gate had been raised; then, as if from sheer wantonness, returned and blew all the remnants of the dam to pieces. This they professed to do on the order of the Board of Health of Beltrami village, in spite of the fact that the village had urged the construction of the dam and had never made complaint to the owners concerning the dam.

There is something about the woods life in Minnesota—probably common to other wooded sections—that encourages thieving and destruction of property owned by non-residents. About Bemidji, timber stealing by settlers is such a common custom as to be thought not even a minor error. Many small mills saw steadily on timber largely stolen by settlers from tracts owned by absentees, but contiguous to the homesteads of the thieves. This timber is generally stolen in a most wasteful way, the finest and most accessible trees being felled and but one or two clear logs taken from them, the rest being left to rot. The lumber made from these stolen logs is hauled to railway stations, sometimes as far as thirty miles from the stolen timber tracts. The thief is generally immune from punishment, for he knows that he will be tried by a jury of his peers, that is to say, a jury of timber thieves. The laws protecting human life were never violated in the black parishes of Mississippi with more impunity than are the laws protecting non-resident property in the Pine counties of Minnesota."—*Mississippi Valley Lumberman.*

The Mohave River Watershed.

A field party from the Division of Forestry has started for southern California to make a detailed investigation of the soil cover of the watershed of the head waters of the Mohave River. A preliminary investigation of this watershed was made in October, 1899, when it was ascertained that comprehensive data regarding precipitation, run off, wind velocity, and evapora-

tion, covering a period of several years had been collected. It was further ascertained that the watershed in question included secondary drainage basins representing different types of soil cover which varied from dense forests to open chapparal.

Conditions appear to be particularly favorable for undertaking the solution of the important problem of soil cover and the run off of streams. The party now going into the field is to investigate the soil cover including forest and chapparal growths on all parts of the watershed. The data regarding soil cover obtained from each of the secondary drainage basins will later be compared with the data regarding rainfall and run off on the same basins. It is thought that the investigation will result in the possibilty of arriving at a scientific conclusion regarding the relation of soil cover to run off.

Drouth, Fire, and a Shortage in Lumber.

"A shortage in lumber and consequent higher prices for this season are predicted by dealers in the West. The shortage is ascribed to the forest fires and the drought in the lumber-producing sections of the Northwest. The shortage of December 1, 1899, as compared with the same date in 1898, was 766,000,000 feet; as compared with the same date in 1897, was 1,187,000,000 feet; and with the same date in 1895, was 1,452,000,000 feet, showing a large ratio of decrease in product. It was expected, on account of advanced values, that the production for 1900 would overcome a large part of this shortage for the present season by the stimulation of log output, but because of unfavorable logging conditions there has resulted an additional shortage of log production. Lack of snow in the lumber districts seriously interfered with the hauling of logs to the river bank, and low water in the rivers has prevented the delivery to the mills of much of the timber sledded to the rivers. There is no likelihood of relief in this respect, as the season of floods is past. Added to the shrinkage in supply are the losses of millions of feet by forest fires, and the loss by the fire in Ottawa, coupled with the fact that there can be no output this season from the mills burned in that fire."—(New York) *Evening Post.*

A Southern Hardwood Purchase.

"The purchase is announced of 156,750 acres of hardwood timber land in Sharkey and Washington counties, Mississippi. The buyer is George T. Houston & Co., and the sellers the Illinois Central and Yazoo & Mississippi Valley railroad companies. This tract is the largest virgin forest in the South and is situated in the Yazoo Delta. It consists mainly of White Oak the quantity of which cannot be estimated. It is virtually a solid body 70 miles long and 8 to 20 miles wide. It is between the Yazoo & Mississippi Valley Railroad and the Sunflower River. The price exceeds $1,000,000 and gives Houston & Co. the largest holdings of hardwood stumpage in that territory. * * * A number of mills are to be erected on the new acquisition and the lands as soon as denuded of timber will be sold for agricultural purposes. In addition to the White Oak there is a large quantity of Cypress, Poplar, Cottonwood and Red Gum."—*Mississippi Valley Lumberman.*

Preserve Natural Reservoirs.

Mr. T. P. Lukens, vice-president of the Forest and Water Supply Society of Southern California, began an article which appeared recently in the *California Cultivator*, with the statement that it was not the question of cheap lumber, but that of the water supply which concerned the southern part of the State. In the course of this article Mr. Lukens said: Far up the San Gabriel river, there are vertical walls many hundred feet high. At first glance they appear as solid as a marble shaft, but on observing closely, you see innumerable places where water is exuding. Further down the formation is more broken and the granite disintegrated. In fact, our mountains are a perfect sponge, admirably adapted for conserving the water, if there is something to hold the excessive precipi-

tation in check for a while. This great natural reservoir cannot be emptied suddenly as can the artificial one, by opening the flood-gates, neither can it be re-filled so quickly, owing to the slow process of percolation. What are we to do to fill and keep full this great reservoir? First of all, prevent fire from burning off the trees and brush. The fires in destroying the foliage not only permit the sun and wind to evaporate a large per cent. of the water, but consume the humus that does so much to hold the water in check, acts as a mulch to prevent evaporation and permit percolation; after fire the rain deposits a cement on the surface with the ashes, that prevents percolation, and concentrates the water into torrents, tearing out great quantities of débris to cover up and flood the fertile valleys."

Forestry in Arkansas. The Sawyer and Austin Lumber Company, which owns 85,000 acres of short leaf Pine land in Grant, Jefferson, and Saline counties, Arkansas, recently applied to the Division of Forestry for a detailed working plan for their tract. The preliminary examination has been made and a favorable report submitted to the company. A contract has now been drawn up between the Sawyer and Austin Lumber Company and the Division of Forestry, in which the latter agrees to make a thorough investigation of the tract and to make out a detailed working plan and the Lumber Company undertakes to pay the expenses of experts of the Division in the field.

The Fire Came too Fast. "The North Western Lumber Co., had an experience near their plant at Stanley that illustrated how rapidly fire moves when it gets under headway. They are pretty well prepared for emergencies of the kind, but in this case protection did not protect. They have mounted two old boilers on a flat car with a small engine, and when it becomes necessary run a hose from the locomotive, to furnish steam. With this they can keep a stream of water running from the boilers for an hour or more. Some days ago their men saw a fire in an old Hemlock slashing about two and a-half miles from a landing where they had a million and a half Hemlock and Pine logs. They ran to town with a locomotive and hooked up to the fire department car. They were back in about a half an hour. but the fire had moved more rapidly than they, and the logs were just a charred lot of stubs when they reached the landing." —*Mississippi Valley Lumberman.*

Assistant Professor of Forestry at Yale. At a meeting of the Yale Corporation, on May 22d, Professor J. W. Toumey was elected Assistant Professor of Forestry. The Yale Forest School is very fortunate in securing the services of Professor Toumey. He was formerly connected with the Arizona Agricultural College, as Professor of Botany and Horticulture, and was for a time Acting Director of the Experiment Station. For about a year he has been the Superintendent of Tree-Planting in the Division of Forestry. His training in the Division and previously in the West has given him a wide knowledge of forestry, especially along the lines of tree planting. The courses which will be given by Professor Toumey will be Forest Botany, Outlines of Forestry, Forest Planting and Sowing, Forest Technology, Lumbering, and Forest Protection.

An Ancient Cedar. "A Cedar tree whose age has been reckoned by geologists at twenty-five thousand years has been found in California, standing in an excellently preserved state, the fibers so perfect and the wood so strong that it was cut up and used for timbering in the construction of a mining tunnel. This remarkable instance of the preservation of organic remains was found in the heart of a mountain, perhaps five hundred feet below the summit. This mountain is a spur of the Sierra Nevadas, near the Forest Hill divide, in Placer County, between the North and Middle forks of the American River.

The mountain is lava capped with one of those singular table tops which show that there was once a day when all those ravines with which the region now abounds did not exist, and that what is now the crest of the mountain was once the lowest plane in a topography vastly different from that which exists to-day."—*St. Louis Lumberman.*

Gathering up Black Walnut. "White county, Tenn., is one of the plateau counties on the western slope of the Cumberland Mountains, and once contained a vast amount of the finest Black Walnut timber. The timber has pretty well all been cut, and now they are selling the stumps. The trees were cut down in a wasteful manner with axes, leaving high stumps. In the early days of the lumber trade these fine Walnut trees were sold for 'a song,' so to speak, and the songs remain unsung. Some of the large stumps now bring more money than the whole tree sold for. A correspondent at Sparta, the county seat, says:

'The railway yards here are full of Walnut stumps ready to be loaded for shipment. Considerable money is being paid out through the county for these old stumps. Some very fine specimens have been brought in which will net the dealers a handsome profit.'

We are not informed as to who are the dealers, to whom the stumps are sold, or to what uses they are put, but presume the veneer manufacturers buy most of them."—*Southern Lumberman.*

On the Raquette River. The "Malby Bill," which was brought into the New York Legislature "to provide for the establishment and maintenance of storage reservoirs on the Raquette River and its tributaries," failed to pass the Assembly. A bill of somewhat similar appearance, which was passed, however, and signed by Governor Roosevelt, is of an entirely different character. It provides for levying an assessment on owners of water power along the Raquette River, such assessment to be used for repairing the old dam at Raquette Pond, just below the railway station at Tupper Lake Junction. The reconstructed dam will not be high enough to injure any timber or do any damage to the scenery. That mischief was inflicted years ago by the old dam, which was maintained at a height much greater than that of the one now proposed. Any change in the scenery which may result from the reconstruction will be in the way of an improvement.

The Largest Tree. The largest tree in the world is to be seen at Mascali, near the foot of Mount Etna, and is called "The Chestnut Tree of a Hundred Horses." Its name rose from the report that Queen Jane of Aragon, with her principal nobility, took refuge from a violent storm under its branches. The trunk is 204 feet in circumference.

To Lumber in the Philippines. "A company has been organized at Chicago and incorporated under the laws of West Virginia with a capital of $5,000,000 to handle fine woods, such as Mahogany, Rosewood and Ebony. The company will operate in the Philippines, developing the lumber industry there and shipping their products to this country and to Europe."—*Mississippi Valley Lumberman.*

Comment on the Appalachian Park. "The Appalachian Mountain Club, of Asheville, N. C., has petitioned the Senate and House of Representatives of the United States to take measures looking to the establishment of a National Park in the southern Appalachians. The main idea of the park is the application of scientific forestry to non-agricultural lands of this section, the parking of the domain being means to this end. It would be well if all the applications to Congress had as much merit as this. The economic value of such park and the conservation of the lumber industry by the application of scientific forestry is very evident to every practical

lumberman, and, should this effort of the Appalachian National Park Association be crowned with success and lead the government to do what they asked them to do, we have no doubt that in time the park might be made self-supporting. We have no data as to what it would cost to keep the park in order, but we have an idea that the mature timber which might be cut and sold on such a reservation would produce enough revenue to pay the interest on all it costs.

The *Journal* is heartily in favor of such a park, and hopes that Congress will give it favorable attention."—New York *Lumber Trade Journal.*

RECENT PUBLICATIONS.

A Guide to the Trees, by Alice Lounsberry and Mrs. Ellis Rowan. 313 pp., 64 colored plates, 164 uncolored illustrations. Frederic A. Stokes Co., New York. 1900.

"A Guide to the Trees" is another sign of the increasing popular interest in trees and things outdoors. It describes and illustrates nearly two hundred species of trees and shrubs, the description of the parts of each tree being given in semi-botanical language, followed by notes of a general and untechnical nature—historical, anecdotal or otherwise. As the object of the book is to help the reader to recognize our common trees at sight a colored or uncolored illustration of each species is given.

The scale to which the drawings in this book are made is not shown, and the descriptions often fail to indicate the average size of the leaves, etc., from which might be determined the proportionate size of the different parts. Of the illustrations of entire trees few can be said to give an adequate idea of the form and other characters of the species they are supposed to represent. Many of our important timber species are illustrated by examples grown in the open, which are wholly unlike the types met with in the woods. The distinguishing features of these two types are not accounted for in the text, nor are the real characters of many of our common trees either mentioned or illustrated. It would seem that a book which, like the "Guide to the Trees," is intended for unscientific readers, ought to bring out clearly the special differences between the various trees considered. To this end life-size illustrations of distinctive points, and also comparisons of those which look alike in some species would be of the greatest help to the majority who have no time to discover the distinctions by painstaking analysis.

J. F.

The Difficulties and Possibilities of Forestry as a Business. Two articles in the *American Lumberman* for March 31st, by C. A. Schenck and Geo. H. Holt.

Mr. Schenck concludes, in the words of Mr. Holt, "that neither the small nor the large land owner, nor the investor, nor the speculator can afford to engage in it [forestry], and that 'as the country requires forestry, the country had better practice it on its own account.'" Mr. Holt is an active lumberman and timber owner who agrees "with him that lumber-forestry by private ownership under existing laws and conditions" would be out of the question, but proposes an interesting plan for government ownership under contract. He would have the private individual bear the expenses of planting, supervision, etc., and make an "equitable" "division" of profits with the government in return for remission of taxes, and protection from fire and theft. Mr. Holt thinks that such a plan would pay and prove popular.

Our Native Trees and How to Identify Them: *a Popular Study of Their Habits and Their Peculiarities.*" By Harriet L. Keeler. 8vo, pp. 533; 178 illustrations from photographs and 162 from drawings. New York, Charles Scribner's Sons. 1900. Price $2.00, *net.*

The appearance in 1890 of Newhall's popular book on the *Trees of North Eastern America* marked the beginning of a period of book making for the help of busy people interested in trees. Some good, and some doubtfully useful tree books have since appeared. Markedly there is a praiseworthy attempt on the part of authors of this period to make the study of our common trees as easy as possible. They have recognized that there is a much larger class of interested, casual observers of trees, than there is of those plodding students of botany who have time and inclination to learn these plants by the old long way. The attempt to serve the former busy class of people with books in which technical plant characters are clearly described in every-day language seems one of the most admirable efforts of modern popular science work. There is room for more and better works with this popular intent, and it is with pleasure that we notice the coming of another tree book.

The compass of the present book includes the following features: a short key, based on leaf characters, to serve as a guide to groups and

species of the broadleaf trees only. The conifers are omitted. Technical descriptions are given for 126 native trees (one of which is usually considered a shrub), with partial descriptions of 11 other natives and 8 exotics. The leaf characters of 129 native trees and 16 exotics are illustrated by half-tones. One hundred and sixty-two line drawings are intended to illustrate many characters not displayed by half-tones. Eighteen half-tones give the general appearance of as many different trunks; while a few other half-tones show additional leaf-forms of species already illustrated.

The author has added to the formal descriptions some wood lore and popular notes including poetic and historical allusions to the species, with occasional mention of its geologic history. As a help in understanding the technical description the book concludes with a short chapter on the form and structure of roots, stems, leaves, flowers and fruits; together with a glossary of botanical terms.

The sequence of families, genera, and species conform to that of botanical text-books.

In brief, the author has endeavored to give for about 145 trees the common and botanical names, and their distinguishing characters by technical descriptions and illustrations, together with the natural habitat and all available notes of popular interest. She does not say how far she has depended on nature in her descriptions, but makes grateful acknowledgement to a long list of reliable descriptive tree books. We mention this doubtful point to show that readers of to-day like to know how much the author has personally seen and gathered from a study of the trees themselves, and how much has been compiled. However, the technical descriptions are scrupulously accurate, and have the ring of text-book botany. It is to be regretted, however, that these descriptions were not presented in untechnical language. Busy people are apt to sigh at their inability to translate "dicœcious," "axillary panicles," "petals papilionaceous," "stamens diadelphous inferior," and "fruit echinate loculicidally 3-parted." But when they compare their specimens with the excellent half-tone figures they will not fail to get help. The accuracy and the clearness of these pictures give a high value to the book. As much, however, cannot be said of the line drawings, and one only wishes that the author had photographed the subjects of these drawings too. The skill of the artist is very poor, and in some cases has added confusion.

In the treatment of the various topics under each species there are some errors of omission; the author seems to have nodded or supposed the reader would not care if omissions were made. For example, we are given the meaning of a number of botanical names, and then suddenly several species are slighted. Similarly, also, we learn where a lot of trees are found, and then for some others we are left to guess their habitat, or are given a part only of the range.

There are some errors of commission. We learn for the first time that the "White Pine is the tallest of all cone-bearing trees." Evidently the author has not seen or read of the Western Pines, nearly 100 feet higher than the eastern White Pine. The cone-bearing Sequoias, at least 200 feet higher are passed over.

It would be discouraging to forestry, if, as the author says, "White Pine cannot come again on a tract devastated by fire." But fire does not bar its return, if the ground is not burned over again soon.

The Sycamore is said to occur singly only. The author has not yet stumbled into a Sycamore swamp where these trees prevail over many acres.

Black Cherry is said to be ordinarily 40 to 50 feet high, but "in Nebraska, Kansas and Texas region" it is 100 feet high. We are sure that trees of this dimension are to be found only in the southern Alleghany Mountain region. The statement is also made that "all native Alders east of the Rocky Mountains are shrubs." *Alnus maritima* is an eastern species and certainly not a shrub. The author tells us in another place that *Juniperus Virginiana* (Red Juniper) is found in the Rocky Mountains. This is not true. The Rocky Mountain red-wooded species is *Juniperus scopulorum*, and very distinct from the eastern Red Juniper.

Tilia Europæa is described as a species cultivated in this country. The author should have known that as represented in the United States, *T. Europæa* includes three very distinct species, *T. platyphyllos*, *T. vulgaris* and *T. cordata*.

The plate marked *Cornus alternifolia* looks more like a *Ceanothus*. The leaves of *Cornus alternifolia* are quite different from those in the plate, and the fruit is borne in a large, long-stemmed, flat cluster (cyme).

The author's statement that the Cucumber tree has two forms, one when grown in the open, and the other when found in the forest, is quite true, but might lead one to infer that this is not true also of other species. As a matter of fact many other trees exhibit these two forms, the low-branching form of open ground being produced very frequently if the seedlings begin life in the open.

G. B. S.

The Forest Tent Caterpillar. By Clarence M. Weed. Bulletin 64 of the New Hampshire College Agricultural Experiment Station. 24 pp. Illustrated.

During the last three years the Forest Tent Caterpillar has been doing a great deal of damage to orchards, groves of sugar maples, and deciduous forests generally in different parts of New Hampshire and the neighboring states. Bulletin 64 of the New Hampshire College Agricultural Experiment Station is a popular and profusely illustrated account of the life and habits of this insect. It ends with a discussion of different methods of preventing its ravages.

MAP OF SOUTH AFRICA

(32x46 Inches)

Showing the Main Roads, Railroads, Telegraph Lines, Rivers, Streams, Fords, Stations, etc., of the Present Seat of War in South Africa.

Prepared Under the Supervision of the War Department.

N. Y. Tribune: We cordially commend it as the most satisfactory and trustworthy of any we have seen. Necessary to every one who wishes to follow the movements of the British and Boer troops.

Sent on Receipt of 25 Cents in Stamps.

Supplement to the NATIONAL GEOGRAPHIC MAGAZINE for December.

$2.50 a Year, 25 Cents a Copy.

CORCORAN BUILDING, WASHINGTON, D. C.

The object of The American Forestry Association is to promote

1. A more wise and conservative treatment of the forest resources of this continent.
2. The advancement of educational, legislative and other measures to that end.
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the proper utilization of forest products, methods of reforestation of waste lands, the planting of trees for ornament, and cognate subjects of arboriculture.

The Association desires and needs as members all who are interested in promoting the objects for which it is organized—all who realize the importance of using the natural resources of the country in such a manner as not to exhaust them, or to work ruin to other interests. In particular we appeal to owners of timber and wood-land, to lumbermen and foresters, as well as to engineers, professional and business men who have to do with wood and its manifold uses, and to persons concerned in the conservation of water supplies for irrigation or other purposes.

Forest matters are under discussion by committees of national and State legislatures and by the public. Much good can be accomplished if there is organization of effort.

THE AMERICAN FORESTRY ASSOCIATION, Washington, D. C.

SEE PREVIOUS PAGE BUT ONE.

Kindly mention THE FORESTER in writing.

ESTABLISHED 1802

THORBURN'S SEEDS

We are Headquarters for

American and European Tree Seeds

AND NATURAL GRASSES.

Catalogues Free on Application.

J. M. THORBURN & CO.

(Late of 15 John Street)

36 CORTLANDT STREET, NEW YORK

HARVARD UNIVERSITY

Lawrence Scientific School

Twelve Departments of study leading to the degree of Bachelor of Science. Civil Engineering, Electrical Engineering, Mechanical Engineering, Mining and Metallurgy, Architecture, Landscape Architecture, Chemistry, Geology, Biology, Anatomy and Physiology, For Teachers of Science, and General Science.

For Descriptive Pamphlet apply to

J. L. LOVE, Secretary, Cambridge, Mass.

N. S. SHALER, Dean.

YALE FOREST SCHOOL,

NEW HAVEN, CONN.

THE YALE FOREST SCHOOL will open September 27, 1900. The course of study covers a period of two years. Graduates of collegiate institutions of high standing will be admitted without examination, provided they can show the requisite knowledge of Botany, Geology, and Inorganic Chemistry.

A Summer School of Forestry, under the direction of the professors in the Yale Forest School, will be open in July, 1901.

For further information address

HENRY S. GRAVES,

Professor of Forestry,

NEW HAVEN, CONN.

Kindly mention THE FORESTER in writing.